



# Generating Self-Signed Certificates with VDS-SM

This appendix describes the process for using VDS-SM to generate self-signed certificates that are used with the Splunk process to enable the transaction logs to be transferred from the Cisco Videoscape Distribution Suite, Internet Streamer (VDS-IS) Service Engines (SEs) and Service Routers (SRs) to the VDS-SM using SSL encryption.



**Note**

This appendix provides only one example of generating self-signed certificates. Other tools can be used to generate these certificates.

This appendix contains the following sections:

- [Generating a Root Certificate](#)
- [Generating a Server Certificate](#)
- [Generating a Client Certificate](#)
- [Installing Certificates on VDS-SM](#)
- [Validating Configurations](#)



**Caution**

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The Splunk UF SSL encryption process uses Root certificates, Client certificates, and Server certificates. This appendix provides the steps to generate each of these certificates.



**Note**

When generating the certificates, it is important to follow these guidelines:

- When generating the Root certificate, do not specify a common name or challenge password.
- When generating the Server certificate, do not specify a challenge password.
- When generating the Server certificate, make note of the common name. You will need to reference this common name while configuring SSL on the forwarder.

- When generating the Client certificate, do not specify a common name or challenge password.

## Generating a Root Certificate

Follow these steps to generate a Root certificate:

- 
- Step 1** Log in to the operating system of any VDS-SM Forwarder.
- Step 2** Enter the command `cd /opt/splunkforwarder/bin/` to change directories.
- Step 3** To generate the ECDH key that will be used for the Root certificate, enter the following command:  
**splunk cmd openssl ecparam -name <curve\_name> -genkey -noout -out <CA\_temp\_key.key>**  
 for example:  

```
splunk cmd openssl ecparam -name secp256k1 -genkey -noout -out CATempKey.key
```
- Step 4** To encrypt the key that was generated in Step 3 with the AES-256 algorithm, enter the following command:  
**splunk cmd openssl ec -in <CA\_temp\_key.key> -aes256 -out <CA\_key.key>**  
 where <CA\_temp\_key.key> is the name of the key file generated in Step 3. For example:  

```
splunk cmd openssl ec -in CATempKey.key -aes256 -out CAKey.key
```
- Step 5** To generate the certificate signing request for the Root certificate, enter the following command:  
**splunk cmd openssl req -new -[sha256 | sha384] -key <CA\_key.key> -out <csr\_name1.csr>**  
 where <CA\_key.key> is the name of the certificate file generated in Step 4.



### Note

When prompted, do *not* enter a common name or challenge password.

For example, to generate a certificate signing request that uses SHA-384, enter the following:

```
splunk cmd openssl req -new -sha384 -key CAKey.key -out CACertificate.csr
```

- Step 6** To generate the Root certificate, enter the following command:  
**splunk cmd openssl x509 -req -in <csr\_name1.csr> -[sha256 | sha384] -signkey <CA\_key.key> -CAcreateserial -out <root\_certificate\_name.pem> -days <valid\_time>**  
 where <csr\_name1.csr> is the name of the file created in Step 5, <CA\_key.key> is the name of the file created in Step 4, and <valid\_time> is the number of days for which the root certificate is valid.  
 For example, to generate a Root certificate that uses SHA-384, enter the following:  

```
splunk cmd openssl x509 -req -in CACertificate.csr -sha384 -signkey CAKey.key -CAcreateserial -out CACertificate.pem -days 1095
```
- Step 7** Next, perform the steps in the [Generating a Server Certificate](#) section to generate the Server certificates.

## Generating a Server Certificate

Follow these steps to generate a Server certificate:

**Step 1** From the operating system of any VDS-SM Forwarder, if you are not in the `/opt/splunkforwarder/bin/` folder, enter the command `cd /opt/splunkforwarder/bin/`.

**Step 2** To generate the ECDH key that will be used for the Server certificate, enter the following command:  
**splunk cmd openssl eparam -name <curve\_name> -genkey -noout -out <server\_temp\_key.key>**  
 for example:

```
splunk cmd openssl eparam -name secp256k1 -genkey -noout -out ServerTempKey.key
```

**Step 3** To encrypt the key that was generated in Step 2 with the AES-256 algorithm, enter the following command:

**splunk cmd openssl ec -in <server\_temp\_key.key> -aes256 -out <server\_key.key>**

where `<server_temp_key.key>` is the name of the key file that was generated in Step 2. For example:

```
splunk cmd openssl ec -in ServerTempKey.key -aes256 -out ServerKey.key
```



**Note** The server key name that is created in Step 3 is referenced in the `inputs.conf` on the VDS-SM.

**Step 4** To generate the certificate signing request for the Server certificate, enter the following command:

**splunk cmd openssl req -new -[sha256 | sha384] -key <server\_key.key> -out <csr\_name2.csr>**

where `<server_key.key>` is the name of the key file that was generated in Step 3.



**Note** When prompted, do *not* enter a challenge password.

For example, to generate a certificate signing request that uses SHA-384, enter the following:

```
splunk cmd openssl req -new -sha384 -key ServerKey.key -out ServerCertificate.csr
```



**Note** Make note of the common name that you enter. You will need to reference this common name while configuring SSL on the forwarder.

**Step 5** To generate the Server certificate, enter the following command:

**splunk cmd openssl x509 -req -in <csr\_name2.csr> -[sha256 | sha384] -CA  
 <root\_certificate\_name.pem> -CAkey <CA\_key.key> -CAcreateserial -out  
 <server\_temp\_certificate.pem> -days <valid\_time>**

where `<csr_name2.csr>` is the name of the certificate signing request file from Step 4, `<root_certificate_name.pem>` is the name of the Root certificate file that was generated in Step 6 of the [Generating a Root Certificate](#) section, and `<CA_key.key>` is the name of the key file that was generated in Step 4 of the [Generating a Root Certificate](#) section. For example, to generate a Server certificate that uses SHA-384, enter the following:

```
splunk cmd openssl x509 -req -in ServerCertificate.csr -sha384 -CA CACertificate.pem  

-CAkey CAKey.key -CAcreateserial -out ServerTempCertificate.pem -days 1095
```

**Step 6** To consolidate the signed Server certificate, the Server key, and the certificate of the CA into a single PEM file, enter the following command to create a PEM file:

**cat <server\_temp\_certificate.pem> <server\_key.key> <root\_certificate\_name.pem> >  
 <server\_certificate.pem>**

where `<server_temp_certificate.pem>` is the name of the server certificate file that was created in Step 5, `<server_key.key>` is the name of the key file that was generated in Step 3, and `<root_certificate_name.pem>` is the name of the Root certificate file that was generated in Step 6 of the [Generating a Root Certificate](#) section. For example:

```
cat ServerTempCertificate.pem ServerKey.key CACertificate.pem > ServerCertificate.pem
```

**Step 7** Next, perform the steps in the [Generating a Client Certificate](#) section to generate the Client certificates.

## Generating a Client Certificate

Follow these steps to generate a Client certificate:

**Step 1** From the operating system of any VDS-SM Forwarder, if you are not in the `/opt/splunkforwarder/bin/` folder, enter the command `cd /opt/splunkforwarder/bin/`.

**Step 2** To generate the ECDH key that will be used for the Client certificate, enter the following command:  
**splunk cmd openssl eparam -name <curve\_name> -genkey -noout -out <client\_temp\_key.key>**

For example:

```
splunk cmd openssl eparam -name secp256k1 -genkey -noout -out Client1TempKey.key
```

**Step 3** To encrypt the key that was generated in Step 2 with the AES-256 algorithm, enter the following command:

**splunk cmd openssl ec -in <client\_temp\_key.key> -aes256 -out <client\_key.key>**

where `<client_temp_key.key>` is the name of the key file that was generated in Step 2. For example:

```
splunk cmd openssl ec -in Client1TempKey.key -aes256 -out Client1Key.key
```



### Note

You will reference the Client key that you generate in Step 5 in the VDS-IS Splunk configuration.

**Step 4** To generate the certificate signing request for the Client certificate, enter the following command:  
**splunk cmd openssl req -new -[sha256 | sha384] -key <client\_key.key> -out <csr\_name3.csr>**  
where `<client_key.key>` is the name of the key file that was created in Step 3.



### Note

When prompted, do not specify challenge password or common name.

For example, to generate a certificate signing request that uses SHA-384, enter the following:

```
splunk cmd openssl req -new -sha384 -key Client1Key.key -out Client1Certificate.csr
```

**Step 5** To generate the Client certificate, enter the following command:

**splunk cmd openssl x509 -req -in <csr\_name3.csr> -[sha256 | sha384] -CA  
<root\_certificate\_name.pem> -CAkey <CA\_key.key> -CAcreateserial -out  
<client\_temp\_certificate.pem> -days <valid\_time>**

where `<csr_name3.csr>` is the name of the certificate signing request that was generated in Step 4, `<root_certificate_name.pem>` is the name of the Root certificate file that was generated in Step 6 of the [Generating a Root Certificate](#) section, and `<CA_key.key>` is the name of the key file that was generated in Step 4 of the [Generating a Root Certificate](#) section.

For example:

```
splunk cmd openssl x509 -req -in Client1Certificate.csr -sha384 -CA CACertificate.pem
-CAkey CAKey.key -CAcreateserial -out Client1TempCertificate.pem -days 1095
```

- Step 6** To consolidate the signed Client certificate, the client key, and the certificate of the CA into a single PEM file, enter the following command to create a PEM file:

```
cat <client_temp_certificate.pem> <client_key.key> <root_certificate_name.pem> >
<client_certificate.pem>
```

where `<client_temp_certificate.pem>` is the name of the client certificate file that was created in Step 5, `<client_key.key>` is the name of the key file that was generated in Step 3, and `<root_certificate_name.pem>` is name of the Root certificate file that was generated in Step 6 of the [Generating a Root Certificate](#) section. For example:

```
cat Client1TempCertificate.pem Client1Key.key CACertificate.pem > Client1Certificate.pem
```

Next you will install the certificates on the VDS-SM server.

## Installing Certificates on VDS-SM

Follow these steps to install the certificates on the VDS-SM server:

- Step 1** Enter the following command to copy the certificates to `/opt/splunkforwarder/etc/certificates/` directory:

```
cp <server_certificate.pem> <root_certificate_name.pem> /opt/splunkforwarder/etc/certificates
```

where `<server_certificate.pem>` is the name of the Server certificate file that was generated in Step 6 of the [Generating a Server Certificate](#) section and `<root_certificate_name.pem>` is name of the Root certificate file that was generated in Step 6 of the [Generating a Root Certificate](#) section.

- Step 2** Define the following code stanzas in the `inputs.conf` file. This file is located in the `/opt/splunkforwarder/etc/apps/CDN_UF/local/` folder:

```
[SSL]
rootCA = $SPLUNK_HOME/etc/certificates/<root_certificate_name.pem>
serverCert = $SPLUNK_HOME/etc/certificates/<server_certificate.pem>
password = <server_key_password>
requireClientCert = false
sslVersions = <Required SSL Version>
cipherSuite = <Required ecdh cipherSuite String>
allowSslRenegotiation = true
ecdhCurveName = <ecdh_curve_name>
```

- `<root_certificate_name.pem>` is the name of the Root certificate file that was created in Step 6 of the [Generating a Root Certificate](#) section.
- `<server_certificate.pem>` is the name of the Server certificate that was created in Step 6 in the [Generating a Server Certificate](#) section.
- `<server_key_password>` is the key that was used to create the Server certificate.
- Set `cipherSuite` to `ECDHE-ECDSA-AES256-GCM-SHA384`

- Step 3** After you have finished making edits to the `inputs.conf` file, enter the following commands to restart the Splunk service:

- splunk stop**
- splunk start**

# Validating Configurations

To validate the configurations on VDS-SM, perform the following steps:

## Procedure

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**Step 1** Navigate to the following location: `$SPLUNK_HOME/var/log/splunk/splunkd.log`

**Step 2** In the logs, check for the following lines:

```
INFO TcpInputConfig - IPv4 port 9998 is reserved for splunk 2 splunk (SSL)
INFO TcpInputConfig - IPv4 port 9998 will negotiate new-s2s protocol
```



## Note

If the SSL connection is wrong, the system raises the following errors:

```
ERROR SSLCommon - Can't read certificate file
/opt/splunk/etc/certificates/ServerCertificate.pem errno=33558530
error:02001002:system library:fopen:No such file or directory
ERROR SSLCommon - Can't read key file
/opt/splunk/etc/certificates/ServerCertificate.pem
```